REMARKS

This amendment is in response to the Examiner's Office Action mailed on November 17, 2003. Claims 1-14 were pending, and Claims 1-14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Wada et al (5,559,939) and under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Negishi (5,210,708). Claims 1, 7 and 14 were also rejected under 35 U.S.C. 102(b) as being anticipated by Wada et al (5,559,939).

By the present response, Claims 1-14 remain unchanged.

Response to Rejection of Claims 1-14 under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Wada et al (5,559,939).

The examiner has rejected Claims 1 to 14 under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Wada et al (5,559,939) for the reasons set forth on pages 1-6 of the Office Action. This rejection is respectfully traversed.

To establish a prima facie case of obviousness, the prior art references (or references when combined) must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art and not based on Applicant's disclosure.

In the present case, the Wada disclosure is directed to a method and apparatus which allows an operator to enter an algebraic formula into a document by arranging constituent elements, such as an operator, a symbol, a function and a numerical value, so as to form a graphical element. According to the Wada disclosure, the relationship between the formula's constituent elements is defined using a complicated data structure.

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The algebraic formula disclosed in the Wada disclosure is "solved" using an arithmetic process which generates an execution result based on the relationships defined in the data structure. According to Wada, the execution result is displayed and stored as graphical data. The Wada disclosure describes that the execution result may be displayed as graphical data in the form of numeral values, lists and graphic representations. According to Wada, an operator may substitute different values for variables of the algebraic formula so as to allow the operator to understand what the variables of the algebraic formula imply.

The Examiner states at page 2, paragraph 2, of the Office Action that the Wada disclosure teaches "simultaneous displaying an algebraic formula and graphical representation, and both are interrelated upon each other, which graphical representation are immediately modified by inputting modified or changed algebraic formula". The type of manipulation to which the examiner has referred involves manipulation of the *algebraic formula* In contrast, Claim 1 of the present application requires manipulation of the *graphical representation* of the algebraic formula.

The Wada disclosure fails to teach or suggest manipulation of the graphical representation of the algebraic formula as is recited in Claim 1. Moreover, because Wada does not teach that the graphical representation of the algebraic formula is manipulated, it also fails to teach that the algebraic formula is simultaneously and correspondingly updated in accordance with manipulation of the graphical representation of the algebraic formula.

It will be appreciated from the above that Wada fails to teach or even suggest "manipulating a graphical representation of a defined mathematical equation and processing the manipulation to simultaneously and correspondingly update the *other* displayed representation of the mathematical relationship in accordance with the manipulation of the graphical representation" as recited in Claim 1.

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Thus, Tanaka and Wada, taken either individually or in combination, fail to disclose or suggest the limitations of the claimed invention, as recited in Claim 1.

Thus, at least for the reasons discussed above, Claim 1 is patently distinguishable over the Tanaka and Wada references. Further, Claims 2-6 depend either directly or indirectly upon Claim 1 and thereby inherit at least all of the patentable distinctions thereof.

Moreover, and in relation to the Examiner's rejection of Claim 5, Applicants submit that the Tanaka disclosure fails to teach or disclose manipulation of the graphical representation which manipulation includes translating the graph *with respect to* a set of coordinate axes and dilating the graph *with respect to* a set of coordinate axes as recited in Claim 5. According to the Tanaka disclosure, the graphs of *different* functional formulas can be displayed on *different* coordinate systems in accordance with corresponding coordinate ranges, or the *individual* graphs can be displayed in comparison with one another on *a coordinate range* associated with a selected one of the functional formulas. Thus, the Tanaka disclosure does not teach that the graphs are translated or dilated *with respect* to a set of coordinate axes. Instead, according to the Tanaka disclosure, a graph may displayed on a *different* coordinate range and thus a *different* coordinate axes. Accordingly, the Tanaka disclosure fails to teach manipulation of the graphical representation as recited in Claim 1 *with respect* to a set of coordinate axes.

Claim 7 was rejected on the basis that it has similar scope to Claim 1 and 6. The Tanaka disclosure and the Wada disclosure each fail to disclose "simultaneously displaying...a mathematical relation in the form of a graphical representation and in *another format* being either an algebraic formula or a tabulated set of data which describes the graph or both...manipulating the displayed graphical representation to change its shape or position relative to the co-ordinate axes wherein displayed information in said *other format* is simultaneously and correspondingly changed to continually describe the graph as it is manipulated..." as recited in Claim 7. Thus, the Tanaka and Wada disclosures, taken either alone or in combination, fail to disclose the components of the Claimed Invention, as recited in Claim 7.

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Claims 8-12 and 14 were rejected on the basis that these Claims have similar scope to Claims 1, 5 and 7, and thus the rejections to Claims 1, 5, and 7 have also been applied to Claims 8-12 and 14.

Claim 8 recites an "apparatus for interactively demonstrating an interrelationship between different representations of a mathematical relation, the apparatus including...a visual display device which simultaneously displays at least two of multiple representations of a defined mathematical equation...wherein...a stylus is positionable...and movable...to generate changing position data, the apparatus being responsive to said changing position data...to display in real time a manipulation of the graphical representation corresponding to the movement of the stylus...and wherein the apparatus is responsive to said changing position data to substantially simultaneously and correspondingly update *the other representation* of the mathematical relationship in accordance with the manipulation of *the graphical representation...*"

Neither the Tanaka disclosure or the Wada disclosure, either alone or in combination, teach or suggest such a limitation. Thus, Applicants submit that Claim 8 defines patentable subject matter. Further, Claims 9-13 all depend either directly or indirectly on Claim 8 and thereby inherit at least all of the patentable distinctions thereof.

Claim 14 recites "...a processor...for updating multiple representations of the mathematical representation according to a manipulation of a graphical representation ...". Neither the Tanaka disclosure or the Wada disclosure teach or suggest such a limitation and thus Applicant submits that Claim 14 defines patentable subject matter.

The Tanaka and Wada references taken either individually or as a combination, fail to disclose or suggest the Claimed limitations, as recited in Claims 1-14 and discussed above. Further, it would not be obvious to use the disclosure of these references to interactively demonstrate interrelationships between different representations of a mathematical relationship. Tanaka is directed to displaying and comparing representations of *different* mathematical relationships. Wada is directed

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to a document generation tool which allows an operator to include a graphical representation of a mathematical representation into a document, a field which is unrelated to demonstration of interrelationships between different representations of a mathematical relationship.

In view of the above remarks, reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Wada et al (5,559,939) is requested.

Response to Rejection of Claims 1-14 under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Negishi (5,210,708)

The examiner has rejected Claims 1 to 14 under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Negishi (5,210,708) for the reasons set forth on pages 6-10 of the Office Action. This rejection is respectfully traversed.

The Negishi disclosure is directed to a calculator which allows entry of a functional formula (ref. for example to equation "$f(x) = X^3 + 15X + 66X + 80$" at column 3 line 58) so as to provide a graphical representation (ref. graph illustrated at item 7b of Fig. 2B) of the entered functional formula together with a graphical representation of an integral region (ref. shaded region between points "a" and "b" at item 7b of Fig.2B) over which an integral formula (ref. column 3 lines 37 to 42) corresponding to a definite integral of the functional formula is calculated.

The Examiner states at page 7 (paragraph 2) to page 8 (paragraph 1) of the Office Action that Negishi teaches "simultaneous displaying an algebraic formula and graphical representation and both are interrelated upon the other, which graphical representation are immediately modified by inputting modified or changed algebraic formula. "

The type of manipulation to which the examiner has referred involves manipulation of the *functional formula*. In contrast, Claim 1 of the present application requires manipulation of the *graphical representation* of the functional formula.

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The Negishi disclosure fails to teach or suggest manipulation of the graphical representation (that is, the graph illustrated at item 7b of Fig. 2B) of the functional formula as is recited in claim 1. Moreover, because Negishi does not teach that the graphical representation of the functional formula is manipulated, it also fails teach that the functional formula is simultaneously and correspondingly updated in accordance with manipulation of the graphical representation of the functional formula.

It will be appreciated from the above that Negishi fails to teach or even suggest "manipulating a graphical representation of a defined mathematical equation and processing the manipulation to simultaneously and correspondingly update the *other* displayed representation of the mathematical relationship in accordance with the manipulation of the graphical representation" as recited in Claim 1.

At least for the reasons discussed above, Claim 1 is patently distinguishable over the Tanaka and Negishi references. Further, Claims 1-6 depend directly upon Claim 1 and thereby inherit at least all of the patentable distinctions thereof.

Moreover, and in relation to the Examiner's rejection of Claim 5, Applicants submit that the Tanaka disclosure fails to teach or disclose manipulating the graphical representation of the mathematical relation of the type which includes translating the graph *with respect to* a set of coordinate axes and dilating the graph *with respect to* a set of coordinate axes as recited in Claim 5. According to the Tanaka disclosure, the graphs of different functional formulas can be displayed on different coordinate systems in accordance with corresponding coordinate ranges, or the individual graphs can be displayed in comparison with one another on a coordinate range associated with a selected one of the functional formulas. Thus, the Tanaka disclosure does not teach that the graphs are translated or dilated *with respect* to a set of coordinate axes. Instead, according to the Tanaka disclosure, a graph may displayed on a *different* coordinate range and thus a *different* coordinate axes. Accordingly, the Tanaka disclosure fails to teach manipulation of the graphical representation as recited in Claim 1 *with respect* to a set of coordinate axes.

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Claim 7 was rejected on the basis that it has similar scope to Claim 1 and 6. The Tanaka disclosure and the Negishi disclosure each fail to disclose "simultaneously displaying...a mathematical relation in the form of a graphical representation and in *another format* being either an algebraic formula or a tabulated set of data which describes the graph or both...manipulating the displayed graphical representation to change its shape or position relative to the co-ordinate axes wherein displayed information in said *other format* is simultaneously and correspondingly changed to continually describe the graph as it is manipulated..." as recited in Claim 7. Thus, the Tanaka and Negishi disclosures, taken either alone or in combination, fail to disclose the components of the Claimed Invention, as recited in Claim 7.

Claims 8-12 and 14 were rejected on the basis that these Claims have similar scope to Claims 1, 5 and 7, and thus the rejections to Claims 1, 5, and 7 have also been applied to Claims 8-12 and 14.

Claim 8 recites an "apparatus for interactively demonstrating an interrelationship between different representations of a mathematical relation, the apparatus including...a visual display device which simultaneously displays at least two of multiple representations of a defined mathematical equation...wherein...a stylus is positionable...and movable...to generate changing position data, the apparatus being responsive to said changing position data...to display in real time a manipulation of the graphical representation corresponding to the movement of the stylus...and wherein the apparatus is responsive to said changing position data to substantially simultaneously and correspondingly update *the other representation* of the mathematical relationship in accordance with the manipulation of *the graphical representation...*".

Neither the Tanaka disclosure or the Negishi disclosure, either alone or in combination, teach or suggest such a limitation. Thus, Applicants submit that Claim 8 defines patentable subject matter. Further, Claims 9-13 all depend either directly or indirectly on Claim 8 and thereby inherit at least all of the patentable distinctions thereof.

Claim 14 recites "...a processor...for updating multiple representations of the mathematical representation according to a manipulation of a graphical representation ...". Neither the Tanaka disclosure or the Negishi disclosure teach or suggest such a limitation and thus Applicant submits that Claim 14 defines patentable subject matter.

The Tanaka and Negishi references taken either individually or as a combination, fail to disclose or suggest the Claimed limitations, as recited in Claims 1-14 and discussed above. Further, it would not be obvious to use the disclosure of these references to interactively demonstrate interrelationships between different representations of a mathematical relationship. Tanaka is directed to displaying and comparing representations of *different* mathematical relationships. Negishi is directed to displaying a result of a mathematical process which has been applied to a functional formula using a graphical representation thereof.

In view of the above remarks, reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (5,535,317) in view of Wada et al (5,559,939) is requested.

Response to Rejection of Claims 1, 7 and 14 under 35 U.S.C. 102(b) as being anticipated by Wada et al (5,559,939).

Claims 1, 7 and 14 have been rejected by the Examiner under 35 U.S.C. 102(b) as being anticipated by Wada et al (5,559,939) for the reasons set forth at pages 11-12 of the Office Action. This rejection is respectfully traversed.

The Wada disclosure is directed to a method and apparatus which allows an operator to enter an algebraic formula into a document by arranging constituent elements, such as an operator, a symbol, a function and a numerical value, so as to form a graphical element. According to the Wada disclosure, the relationship between the formula's constituent elements is defined using a complicated data structure.

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The algebraic formula disclosed in the Wada disclosure is "solved" using an arithmetic process which generates an execution result based on the relationships defined in the data structure. According to Wada, the execution result is displayed and stored as graphical data. The Wada disclosure describes that the execution result may be displayed as graphical data in the form of numeral values, lists and graphic representations. According to Wada, an operator may substitute different values for variables of the algebraic formula so as to allow the operator to understand what the variables of the algebraic formula imply.

The Wada disclosure fails to teach or suggest manipulation of the graphical representation of the algebraic formula as is recited in claim 1.

Moreover, because Wada does not teach that the graphical representation of the algebraic formula is manipulated, it also fails to teach that the algebraic formula is simultaneously and correspondingly updated in accordance with manipulation of the graphical representation of the algebraic formula.

It will be appreciated from the above that Wada fails to teach or even suggest "manipulating a graphical representation of a defined mathematical equation and processing the manipulation to simultaneously and correspondingly update the *other* displayed representation of the mathematical relationship in accordance with the manipulation of the graphical representation" as recited in Claim 1.

Thus, the Wada disclosure fails to disclose or suggest the limitations of the claimed invention, as recited in Claim 1. Accordingly, at least for the reasons discussed above Claim 1 is patently distinguishable over the Wada references.

Claim 7 was rejected on the basis that it has similar scope to Claim 1. The Wada disclosure fails to disclose "simultaneously displaying...a mathematical relation in the form of a graphical representation and in *another format* being either an algebraic formula or a tabulated set of data which describes the graph or both...manipulating the displayed graphical representation to change its shape or position relative to the co-ordinate axes wherein displayed information in said *other format* is simultaneously and correspondingly changed to continually describe the
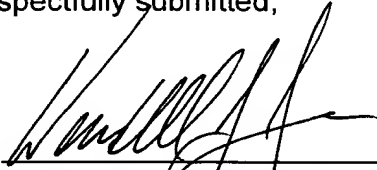
graph as it is manipulated..." as recited in Claim 7. Thus, the Wada disclosure, fails to disclose the components of the Claimed Invention, as recited in Claim 7.

Claim 14 recites "...a processor...for updating multiple representations of the mathematical representation according to a manipulation of a graphical representation ...". The Wada disclosure fails to teach or suggest such a limitation and thus Applicant submits that Claim 14 defines patentable subject matter.

All of the Examiner's comments have been addresses and all of the Examiner's objections have been overcome, thereby placing all Claims pending in the present application in order for allowance. Accordingly, allowance of Claims 1-14 is respectfully requested.

Date: February 17 , 2004

Respectfully submitted,

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